

Oct. 26. 2006 3:58PM INGRASSIA FISHER & LORENZ PC

No. 4190 P. 7/14

Appl. No. 10/696,081

Amdt. Dated October 26, 2006

Reply to Office Action of July 26, 2006

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AMENDMENTS TO THE DRAWINGS

The attached sheets of drawings include changes to FIGS. 2 and 3, and replace original sheets that included the figures. On one sheet, which includes only FIG. 2, the legend "Prior Art" has been added, and on the second sheet, which includes both FIGS. 3 and 5, the legend "Prior Art has been added to FIG. 3 only.

Attachment: Replacement Sheets (2)

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REMARKS

This is a full and timely response to the non-final Office action mailed July 26, 2006. Reexamination and reconsideration in view of the foregoing amendments and following remarks is respectfully solicited.

Request for Publication Date

The Office action cites an article authored by the applicants of the instant invention, and requests that Applicants provide the publication date of the article. It is noted that the Office action requested that the publication date be provided via an affidavit. It is believed, however, that no affidavit is necessary. Indeed, Applicants are unaware of any rule requiring such information be submitted via an affidavit. Applicants submit that full compliance with the request is made by providing the following citation of the article in question:

Adjoint-based system identification and feedforward control optimization in  
automotive powertrain subsystems

Liu, S.; Bewley, T.R.;

Proceedings of the 2003 American Control Conference, 2003.

Volume 3, 4-6 June 2003 Page(s):2566 - 2571 vol.3.

From the above it is clear that the earliest publication date of the cited article is June 4, 2003, which is almost three months after the priority date of the instant application. As such, this article is not prior art to the instant claims.

Objections to the Drawings

The drawings were objected to because FIGS. 2 and 3 were not labeled with the legend "Prior Art," and because FIG. 1 is allegedly inconsistent with the specification. As regards FIGS. 2 and 3, these figures have been amended to include the "Prior Art" legend. As to FIG. 1, it is respectfully submitted that the Examiner has mistakenly misread the specification in making this objection. Specifically, paragraph [0017] refers to the adjoint optimization procedure, which corresponds to steps 104-110 in the flowchart depicted in FIG. 1. Thus, the first step of the adjoint optimization procedure is indeed defining a cost

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function. Hence, it is submitted that no amendments need to be made to FIG. 1.

In view of the foregoing, reconsideration and withdrawal of the drawing objections is requested.

#### Objection to the Abstract

The Abstract was objected to for reciting what is in the title. Applicants have amended the Abstract accordingly, and request withdrawal of the objection.

#### Rejections Under 35 U.S.C. § 112, First and Second Paragraph

Claims 10, 20, and 29 were rejected under 35 U.S.C. § 112, first paragraph for reciting "simulated data." In response, Applicants have canceled Claims 10 and 20, and have excised the language from Claim 29, thus mooted the rejection. Claims 9, 10, and 12-29 were rejected under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite. Specifically, Claims 9, 10, 12, 19, 20, 22, and 29 were objected to for reciting the phrase "the identified model parameters," which is allegedly ambiguous. In response, Applicants have canceled Claims 9, 10, 12, 19, and 20, thus mooted the rejection of these claims. As to Claim 22, Applicants submit that the allegedly ambiguous phrase is not included therein. With respect to Claim 29, this claim has been amended to recite "the identified unknown powertrain system model parameters" to even more clearly specify the particular parameters that are being referenced in the claims.

In view of the foregoing, reconsideration and withdrawal of the § 112, first and second paragraph rejections is solicited.

#### Rejections Under 35 U.S.C. § 102

Claims 1-8, 10, and 12-20 were rejected under 35 U.S.C. § 102 as allegedly being anticipated by a publication authored by Thomas R. Bewley, entitled "Adjoin and Raccati: Essential Tools in the Analysis and Control of Transistional and Turbulent Flow Systems" (Bewley). This rejection is respectfully traversed.

Before proceeding, it is noted that the Office action indicated that Claims 1-29 were rejected under § 102 by Bewley. However, only Claims 1-8, 10, and 12-20 were analyzed in the Office action under this section. As such, it is assumed that the indication that Claims 1-

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29 were rejected under § 102 was a typographical error.

In response to the rejection, and while not conceding its propriety, Applicants have canceled Claims 1-21, thereby mooting the rejection.

Rejections Under 35 U.S.C. § 103

Claims 9, 19, and 29 were rejected under 35 U.S.C. § 103 as allegedly being unpatentable over Bewley, and Claims 11, and 21-29 were rejected under 35 U.S.C. § 103 as allegedly being unpatentable over Bewley, Official Notice, an article by Bewley et al., entitled "Optimal and Robust Control and Estimation of Linear Paths to Transition" (Bewley et al.), and an article by Kolmanovsky et al., entitled "Evaluation of Turbocharger Power Assist System Using Optimal Control Techniques" (Kolmanovsky et al.). These rejections are respectfully traversed.

As to the rejection of dependent Claims 9, 11, 19, and 21, these claims have been canceled, and the rejections thereof are thus mooted. As to the rejection of independent Claim 22, it is noted that this claim is directed to method of identifying unknown model parameters of a non-linear dynamic system model of an automobile powertrain system having one or more system inputs. The methodology recited in at least independent Claim 22 can be quickly executed using a general purpose processor, rather than using much more computationally intensive resources, such as one or more Cray computers.

Bewley is directed to the use of adjoint analyses for fluid flow simulation applications, which are wholly disparate from automobile powertrain systems. The Office action readily acknowledges that Bewley fails to disclose these analyses for powertrain systems, and relies on Kolmanovsky et al. to allegedly bridge this gap. However, as will now be explained, this reference fails to provide any teaching or motivation for making the alleged combination.

Kolmanovsky et al. discloses numerical control techniques to define optimal transient operating strategies for turbocharger power assists systems. Wholly contrary to what the Office action alleges, Kolmanovsky et al. discloses utilizing numerical optimization using the function *constr.m* in Matlab 5.2, and not an analogous adjoint based system modeling technique. Moreover, Kolmanovsky et al. is not concerned with determining unknown model parameters of a non-linear dynamic model.

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Bewley et al. relates to the use of robust control theories for determining effective, estimator-based feedback control rules for laminar plane channel flows that effectively stabilize linearly unstable flow perturbations and linearly stable flow perturbations at Reynolds' numbers at Reynolds numbers of 10,000 and 5,000, respectively. It appears as though this reference was cited merely to evince that its authors were supported, at least in part by GM Powertrain.

It is well-settled that the determination of whether a prima facie case of obviousness has been established requires ascertaining whether or not the teachings of the references, either alone or in combination, would be sufficient for one of ordinary skill in the relevant art having the reference before them to make the proposed substitution, combination, or other modification. In re Linter, 458 F.2d 1013, 1016, 173 USPQ 560, 562 (CCPA 1972). Moreover, obviousness can only be established by combining or modifying references to produce the claimed invention where there is some teaching, suggestion, or motivation to do so, either explicitly or implicitly, in the references themselves or in the knowledge generally available to one of ordinary skill in the art. In re Fine, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988).

Here, it is submitted that one of skill in the art looking to determine unknown model parameters of a non-linear dynamic system model of an automobile powertrain system would not look to the methodology disclosed in Bewley, namely because this disclosure is directed to fluid flow simulation applications. As noted above, fluid flow simulation applications are wholly disparate from automobile powertrain systems, and the person of ordinary skill in the automobile powertrain system art would not look to the teachings associated with fluid flow simulation applications to determine unknown model parameters of a non-linear dynamic automobile powertrain system model. Although, as noted in the Office action, Kolmanovsky et al. does relate, at least somewhat, to powertrains, it fails to include any teaching, suggestion, or motivation for applying any type of fluid flow simulation techniques, let alone the techniques disclosed in Bewley, to an automobile powertrain system model. Moreover, although the authors of Bewley et al. were sponsored, at least in part, by GM Powertrain, the teachings disclosed therein relate to fluid flow and not automobile powertrains.

It is noted that the Office action further alleges that Bewley, on slides 28 and 29,

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provides some type of motivation for extending the analyses disclosed therein to automobile powertrains. Applicants, however, submit that neither of these slides provides such motivation. Indeed, these slides disclose extension to various fluid flow regime applications. In particular, slide 28 suggests an extension to 2-D base flows, such as a cylinder, and slide 29 suggests extension to cross-flow jet mixing enhancement, jet noise reduction, boundary layer and bluff-body flow stabilization, and weather forecasting improvements. None of these proposed extensions provide any motivation for using the disclosed analytical techniques in automobile powertrain systems, let alone for use in determining unknown model parameters of a non-linear dynamic automobile powertrain system model.

In view of the foregoing, Applicants request that the § 103 rejections be withdrawn.

#### Conclusion

Based on the above, independent Claim 22 is patentable over the art of record. The dependent claims are also deemed patentable for the reasons given above with respect to the independent claims and because each recite features which are patentable in its own right.

Hence, Applicant submits that the present application is in condition for allowance. Favorable reconsideration and withdrawal of the objections and rejections set forth in the above-noted Office action, and an early Notice of Allowance are requested.

If the Examiner has any comments or suggestions that could place this application in even better form, the Examiner is requested to telephone the undersigned attorney at the below-listed number.

Respectfully submitted,

Dated: 10/26/00

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